

# SAFETY ALERT



**Safety Alert No. 366**  
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## **Dangerous Levels Of H<sub>2</sub>S Detected At Offshore Facilities**

<b><u>Significant H<sub>2</sub>S Levels for Personnel Safety</u></b>	
*Recommended Exposure Limit (REL):	10 ppm
*Permissible Exposure Limit (PEL):	20 ppm
Immediately Dangerous to Life and Health (IDLH):	100 ppm
Typical alarm set points for...	
Stationary detectors:	20 ppm
Portable detectors (handheld/wearable):	10 ppm

\*For more information, please refer to NIOSH or OSHA websites for H<sub>2</sub>S PEL/REL time



*A typical portable H<sub>2</sub>S detector that can be clipped onto clothing.*

Over the past year, offshore oil and natural gas industry contractors conducting pipeline and well abandonment operations have experienced releases of hydrogen sulfide (H<sub>2</sub>S) into their working areas. H<sub>2</sub>S is a poisonous gas found in sour petroleum reservoirs, and also results from microbes in seawater that has accumulated in pipelines and tanks. Thus, elevated levels of H<sub>2</sub>S can arise from flushing pipelines containing seawater during decommissioning operations. Below are summaries of recent H<sub>2</sub>S release incidents:

- During flushing operations, water was transferred from a pipeline to an open-top flow-back tank. After personnel reported a H<sub>2</sub>S odor coming from the tank, a gas reading was taken in the area. The concentration of H<sub>2</sub>S was 100 parts-per-million (ppm). All operations ceased. Hourly readings were taken and the concentration steadily decreased. No personnel were injured during the incident.
- During flushing operations of a pipeline into the gas buster, a portable gas meter detected a reading of 15 ppm of H<sub>2</sub>S near the gas buster. An "All-Stop" was called immediately. After taking additional readings and determining the area clear of the hazardous gas, an employee began experiencing H<sub>2</sub>S symptoms (i.e., dizziness and nausea). The employee was moved into a safe area with fresh air and was given fluids. His symptoms were monitored until they subsided two hours later.

- During well temporary abandonment operations, the casing was aligned through the choke manifold to the gas buster to take returns. After the choke was open, the H<sub>2</sub>S alarm sounded. All personnel mustered. H<sub>2</sub>S technicians donned their necessary personal protective equipment and took readings at the gas buster liquid outlet, which indicated a level of approximately 2300 ppm from the retrieved sample. The stationary H<sub>2</sub>S sensor directly outside of the vessel measured a peak atmospheric reading of 135 ppm at the time of the incident. The crew periodically took readings and the levels declined. No personnel were injured during the incident.

**Therefore, BSEE recommends that operators consider the following:**

- Inform all personnel of potential sources of H<sub>2</sub>S on the facility, especially during specialized operations that can produce H<sub>2</sub>S as a by-product, such as well stimulations and pipeline abandonment work;
- Ensure that personnel understand that H<sub>2</sub>S may be present even on non-sour service facilities. The first two incidents described above did not occur on sour service facilities;
- Ensure that safe work practices for abandonment work include H<sub>2</sub>S preparedness, enhanced personal protective equipment, and procedures for monitoring personnel in hazardous areas with the potential for exposure;
- Consider H<sub>2</sub>S hazards and mitigations in Job Safety Analyses (JSAs) when conducting abandonment operations;
- Verify that Rescue / Emergency Response Plans include the evacuation of an incapacitated person from a H<sub>2</sub>S area. Review rescue plans before starting a job where H<sub>2</sub>S may be present;
- Periodically perform H<sub>2</sub>S release drills. Drills should include donning respirators, rescuing an incapacitated person and mustering to a safe area;
- Inform personnel who might be involved in attempting rescue of an incapacitated person that they must take precautions to protect themselves. First responders have been injured or killed during gas release rescues;
- Implement the use of portable H<sub>2</sub>S detectors to continuously monitor the presence of H<sub>2</sub>S during operations with the potential for H<sub>2</sub>S exposure;
- Verify that all portable gas detection devices are calibrated quarterly and bump-tested prior to use to confirm accurate readings;
- Ensure that a suitable liquid seal and back-flow prevention device are engaged prior to taking returns to a gas buster from a pipeline where H<sub>2</sub>S could exist; and
- Follow H<sub>2</sub>S guidelines per 30 CFR 250.490 and NTL 2009-G31.

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A Safety Alert is a tool used by BSEE to inform the offshore oil and gas industry of the circumstances surrounding a potential safety issue. It also contains recommendations that could assist avoiding potential incidents on the Outer Continental Shelf.